AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1   1. (Currently amended) A method that facilitates establishing a quorum for
2   a cluster within a plurality of computers that are geographically distributed, the
3   method comprising:
4   detecting a change in membership of the cluster at a computer within the
5   plurality of computers; and
6   upon detecting the change in membership,
7   forming a potential new cluster by attempting to
8   communicate with all other computers within the plurality of
9   computers,
10   accumulating votes for each computer successfully
11   contacted,
12   attempting to gain control of a quorum server located at a
13   site that is geographically separate from all computers within the
14   plurality of computers,
15   if successful, accumulating the quorum server's votes, and
16   if a total of accumulated votes includes a majority of
17   available votes, forming a new cluster from the potential new
18   cluster.

1   2. (Original) The method of claim 1, wherein detecting the change in
2   membership involves:

3   exchanging heartbeat messages with all computers that are part of the

4   cluster; and

5   upon discovering an absence of heartbeat messages from any computer in

6   the cluster, initiating a cluster membership protocol.

1   3. (Original) The method of claim 1, wherein detecting the change in

2   cluster membership includes detecting that the cluster has not been formed.

1   4. (Original) The method of claim 1, wherein attempting to gain control of

2   the quorum server involves communicating with the quorum server using

3   cryptographic techniques.

1   5. (Original) The method of claim 1, further comprising:

2   exchanging a status message with each member of the new cluster; and

3   updating a local status at the computer to a most recent status available

4   within the status message.

1   6. (Currently amended) A method that facilitates establishing a quorum for

2   a cluster within a plurality of computers that are geographically distributed, the

3   method comprising:

4   providing a quorum server at a site that is geographically separate from a

5   location of a computer within the plurality of computers;

6   assigning at least one vote to each computer within the plurality of

7   computers;

8   assigning at least one vote to the quorum server;

9   attempting to establish communications between each pair of computers

10 within the plurality of computers;

11   accumulating a count of votes for each computer communicated with at

12   each computer;

13   attempting to establish control over the quorum server from each computer

14   within the plurality of computers;

15   if control is established over the quorum server, accumulating the quorum

16   server's votes in the count of votes; and

17   establishing the quorum when a majority of available votes has been

18   accumulated in the count of votes.

1   7. (Original) The method of claim 6, wherein the quorum server grants

2   control to only a first computer attempting to establish control.

1   8. (Original) The method of claim 6, wherein the quorum server grants

2   control to only one computer of all computers attempting to establish control

3   based on a pre-established priority list.

1   9. (Original) The method of claim 6, wherein votes are assigned so that the

2   quorum includes at least one computer that was in an immediately previous

3   cluster, to ensure that a cluster formed from the quorum has current data.

1   10. (Original) The method of claim 6, wherein attempting to establish

2   control over the quorum server involves establishing communications with the

3   quorum server.

1   11. (Original) The method of claim 10, wherein establishing

2   communications with the quorum server involves using cryptographic techniques.

1   12. (Currently amended) A computer-readable storage medium storing

2   instructions that when executed by a computer cause the computer to perform a

3   method that facilitates establishing a quorum for a cluster within a plurality of

4   computers that are geographically distributed, the method comprising:

5   detecting a change in membership of the cluster at a computer within the

6   plurality of computers; and

7   upon detecting the change in membership,

8   forming a potential new cluster by attempting to

9   communicate with all other computers within the plurality of

10   computers,

11   accumulating votes for each computer successfully

12   contacted,

13   attempting to gain control of a quorum server located at a

14   site that is geographically separate from all computers within the

15   plurality of computers,

16   if successful, accumulating the quorum server's votes, and

17   if a total of accumulated votes includes a majority of

18   available votes, forming a new cluster from the potential new

19   cluster.

1   13. (Original) The computer-readable storage medium of claim 12,

2   wherein detecting the change in membership involves:

3   exchanging heartbeat messages with all computers that are part of the

4   cluster; and

5   upon discovering an absence of heartbeat messages from any computer in

6   the cluster, initiating a cluster membership protocol.

1   14. (Original) The computer-readable storage medium of claim 12,

2   wherein detecting the change in cluster membership includes detecting that the

3   cluster has not been formed.

1   15. (Original) The computer-readable storage medium of claim 12,

2   wherein attempting to gain control of the quorum server involves communicating

3   with the quorum server using cryptographic techniques.

1   16. (Original) The computer-readable storage medium of claim 12, the

2   method further comprising:

3   exchanging a status message with each member of the new cluster; and

4   updating a local status at the computer to a most recent status available

5   within the status message.

1   17. (Currently amended) A computer-readable storage medium storing

2   instructions that when executed by a computer cause the computer to perform a

3   method that facilitates establishing a quorum for a cluster within a plurality of

4   computers that are geographically distributed, the method comprising:

5   providing a quorum server at a site that is geographically separate from a

6   location of a computer within the plurality of computers;

7   assigning at least one vote to each computer within the plurality of

8   computers;

9   assigning at least one vote to the quorum server;

10   attempting to establish communications between each pair of computers

11   within the plurality of computers;

12   accumulating a count of votes for each computer communicated with at

13   each computer;

14   attempting to establish control over the quorum server from each computer

15   within the plurality of computers;

16   if control is established over the quorum server, accumulating the quorum

17   server's votes in the count of votes; and

18   establishing the quorum when a majority of available votes has been

19   accumulated in the count of votes.

1   18. (Original) The computer-readable storage medium of claim 17,

2   wherein the quorum server grants control to only a first computer attempting to

3   establish control.

1   19. (Original) The computer-readable storage medium of claim 17,

2   wherein the quorum server grants control to only one computer of all computers

3   attempting to establish control based on a pre-established priority list.

1   20. (Original) The computer-readable storage medium of claim 17,

2   wherein votes are assigned so that the quorum includes at least one computer that

3   was in an immediately previous cluster, to ensure that a cluster formed from the

4   quorum has current data.

1   21. (Original) The computer-readable storage medium of claim 17,

2   wherein attempting to establish control over the quorum server involves

3   establishing communications with the quorum server.

1   22. (Original) The computer-readable storage medium of claim 21,

2   wherein establishing communications with the quorum server involves using

3   cryptographic techniques.

1   23. (Currently amended) A system that facilitates establishing a quorum

2 for a cluster within a plurality of computers that are geographically distributed,

3 comprising:

4   the plurality of computers;

5   a network coupling the plurality of computers;

6   a quorum server located at a site that is geographically separate from any

7 one computer of the plurality of computers, wherein the quorum server provides

8 one or more votes to a computer within the plurality of computers that is

9 attempting to form a quorum; and

10   an independent communications link coupling each computer of the

11 plurality of computers and the quorum server.

1   24. (Original) The system of claim 23, wherein the quorum server includes

2 a mechanism for granting control to only one computer of the plurality of

3 computers requesting control.

1   25. (Original) The system of claim 23, wherein the quorum server includes

2 a mechanism for maintaining a list of computers accepted into the cluster.

1   26. (Original) The system of claim 23, wherein the quorum server includes

2 a mechanism for cryptographically ensuring an identity of a computer attempting

3 to establish control.

1   27. (Original) The system of claim 23, wherein the quorum server includes

2 monitoring means to monitor the status of each computer within the plurality of

3 computers.